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ABSTRACT

The "T-cubed: Teacher Teach Thinking" staff development model was developed by teachers, with their colleagues, for their own growth in teaching for effective thinking. The model builds on the cornerstones of the dignity of the teacher, the worth of the individual child, the importance of thorough integration of thinking skills in all subjects at all levels, and a commitment to professional growth. Competence, collegiality, and course of study comprise the dimensions or supporting structure of the model. The dimensions of the model support a working framework of resources, strategies, and applications. Teachers, as well as students, are taught strategies for making meaningful use of knowledge. As teachers consciously focus on tactics for thinking, students begin to take on personal responsibility for their learning; both teachers and students internalize skills which bridge the gap betwen thinking-teaching behaviors and thinking-learning outcomes. Teachers who engage in meaningful staff development, as described in the T-cubed model, not only enhance their teaching but also grow in their own capacity for thinking. (CB)

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(THE T-CUBED MODEL)

Paper Presented at NCSIE Conference
Nashville, Tennessee
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To assume the importance of teaching students to become more effective thinkers in today's society is to touch upon one of the most fundamental aspects of educational theory. Yet, despite its recognized importance, effective teaching for thinking has yet to make an impact upon the majority of American classrooms. In his study, High School (1984), Ernest Boyer found little evidence of students' having the ability to think critically and communicate effectively. In addition, the National Commission on Excellence in Education (1983) found that many high school students do not possess the "higher order" thinking skills we should expect of them. Results of the

Commisson study found that nearly 40 percent cannot draw inferences from written materials. The study also found that only one-fifth of high school students can write a persuasive essay. Further, it was found that only one-third can solve a mathematics problem requiring several steps.

During past years the decline in Scholastic-Aptitude Test (SAT) scores has been the focus of attention among educators. Recent analysis of SAT scores indicates that each year students have been doing significantly less well with questions requiring more complex thinking (Jencks, 1978). Other research data confirm the findings that students are doing poorly in tasks that require critical thinking skills. Teachers, it is assumed, have a responsibility for developing students' thinking skills. What then is the reason for poor student thinking? To answer this question it is necessary to look at the methods teachers currently use and to identify new teaching strategies.

Many teachers value thinking and employ strategies that encourage its development. Yet, a number of probing studies indicate that these teachers do not constitute the majority. Results of one such study conducted by John Goodlad showed that less than one percent of "teacher talk" invited students to engage in more than mere recall of information (Goodlad, 1983).

If a goal of education is that our students acquire critical thinking skills, and if the aim of teaching is to help students develop these skills, then the means of bridging this gap must be identified. If teachers are to change the way their students think, then it follows that teachers must also change the way they teach (Strong, 1986). They must capitalize on all the information educational psychologists can give.

Here one of the most crucial questions concerns the connection between critical thinking and intelligence. In defining intelligence, Perkins (1986) links the power of the intellect with the database of instructional content by means of tactics that promote thinking across the curriculum. If intelligence--thinking--is to be improved, the students' tactical intelligence must be improved. But, states Perkins,

> Tactical intelligence is not a natural thing. It is a bag of tricks--tactics, strategies, techniques, methods, or whatever you want to call them (p. 5).

If students need to be taught tactics for thinking, then teachers must possess a repertoire of thinking strategies to demonstrate, model, and consistently incorporate into every lesson. It is by increasing their own competence in thinking strategies that teachers can significantly affect the level of thinking in their students.

Typcially, teacher education programs have done little to equip teachers with strategies for teaching effective thinking. The need for preservice programs and staff development programs is critical if the gap between teaching and teaching thinking is to be bridged.

"T-cubed: Teachers Teach Thinking"

One approach is the "T-cubed: Teachers Teach Thinking" (Heintschel, 1985) staff development model...developed BY teachers, WITH their colleagues, FOR their own growth in teaching for effective thinking.

Foundation

A number of basic assumptions form the foundation (see Figure 1). These assumptions fall into two categories: assumptions about students and assumptions about teachers. Beyer (1986) indicates that in considering any thinking skills program there are five assumptions which must be made about students. Students can

- think
- be taught to think better than they do.
- be taught to think in all subject areas.
- be taught to think at all levels.
- improve their thinking if engaged in cognitive processes.

If one accepts these assumptions about students, then it would follow that one would accept a parallel set of assumptions regarding teachers. Teachers can

- teach thinking.
- teach thinking better than they do now.
- teach thinking in all subjects.

- teach thinking at all levels.
- improve their own thinking if they are engaged in cognitive processes.

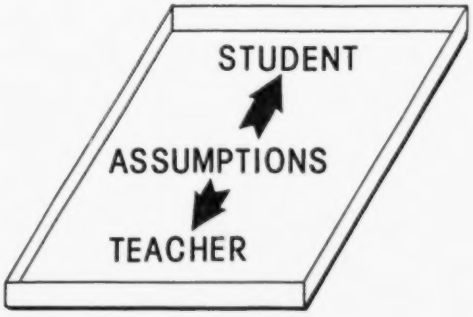

Figure 1. The foundation of the T-cubed model.

Dimensions

The "T-cubed" model builds on the cornerstones of the dignity of the teacher, the worth of the individual child, the importance of thorough integration of thinking skills in all subjects at all levels, and a commitment to professional growth. Competence, collegiality, and course of study comprise the dimensions or supporting structure of the model (see Figure 2).

The model builds on a belief system which values and respects the teachers' judgment and sees teachers as capable of identifying professional growth opportunities to expand and enhance their skills (Walsh and Paul, 1986). The model assumes that the teachers' own reflections on thinking and on their efforts to teach effective thinking are the most valuable resources of a staff development effort. The existing competence of teachers is the first parameter of the model.

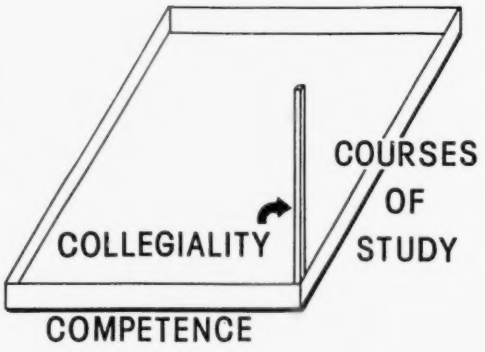

Figure 2. Dimensions of the T-cubed model.

In the implementation of the model, the value of the existing competence of teachers was demonstrated when inservice sessions were presented by a core-team, consisting of three teachers, the principal and a consultant. In the initial inservice sessions, strategies for thinking were explained and modeled. In addition, all faculty members were given the opportunity to participate in regional workshops on teaching thinking. Participating faculty members, in turn, provided additional inservice sessions for their colleagues during regularly scheduled faculty meetings.

Students benefit academically when their teachers share ideas, cooperate in activities and assist one another's intellectual growth (What Works, 1986). Good instruction flourishes when an atmosphere of collegiality pervades the school. The U.S. Department of Education report What Works states that "effective schools have a climate of staff collegiality and use mutual support as a means of improving pupil achievement."(p. 51) This collegiality

constitutes the second dimension of the model. The workshops referred to previously, were planned and conducted by teachers, principal and consultant who developed the plan and conducted the inservice activities. The most profitable staff development sessions were those that allowed participants the most opportunity to share applications of strategies in the various content areas and grades. On both a formal and informal basis, teachers shared classroom experiences. Peer-observations were encouraged and conducted.

The third dimension of the model is defined by the curriculum or course of study. Raths (1967) says that when teachers emphasize thinking with subject matter, students' thinking improves and learning is enhanced. Critical thinking must be an integral part of the course of study, not something separate from it. Strategies which enhance thinking must be taught, modeled, and practiced in all disciplines. The "T-cubed" model supports this concept. All teachers at all levels and in all content areas are expected to teach and model strategies for thinking. A prerequisite to this united effort is the understanding that lesson plan objectives and instructional events must be focused on engaging students in higher level thinking. The inservice sessions focused on helping teachers consciously integrate thinking strategies throughout the curriculum.

Just as three dimensions define the geometric cube, so competence, collegiality and the courses of study define the parameters of staff development for effective thinking.

Faces

The dimensions of the "T-cubed" model support a working framework of resources, strategies, and applications (see Figure 3). Resources for

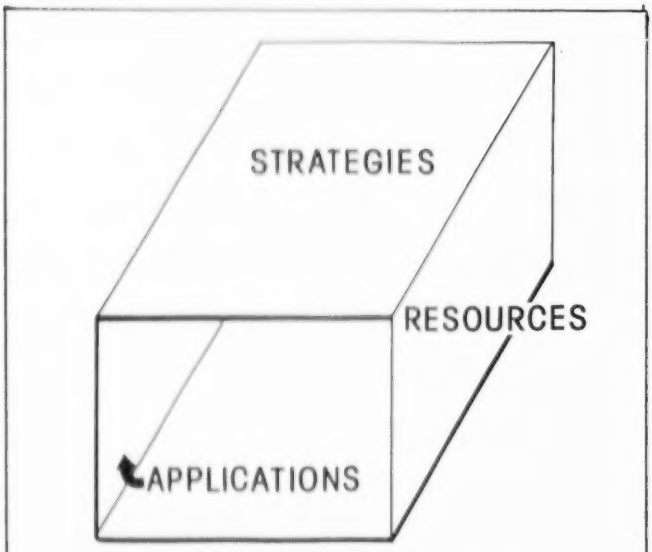

Figure 3. Faces 2, 3, and 4 of the T-cubed model.

teaching thinking are found in many aspects of the school environment. A primary resource is the competence, commitment, motivation and collegiality of teachers, and the instructional leadership and support of the principal. Research supports what many educators intuitively know: the principal has a strong influence on the curriculum to be implemented, the instructional strategies to be employed, and, thus, on student achievement (Costa, 1985). This strong influence is particularly true in a total staff commitment to teaching for effective thinking.

Instructional materials that support the curriculum are a resource and a tool for teaching thinking when used in a "thoughtful" and systemmatic way. When all the potential in the instructional materials is utilized, thinking skills are "deeply embedded in the whole fabric of the instructional program" (Walsh and Paul, 1986, p. 21). Evaluation and selection of instructional materials are made in view of the goal of effective thinking. Budget decisions reflect this priority and available funds are channeled to better support efective teaching for thinking. Sources of supplementary funds are sought. The strength of this approach is that the existing curriculum and its supporting texts and materials are used to teach thinking. The difference--the process of teaching changes.

Good thinking, observes Perkins (1986), is developed by using thinking

frames which empower us to organize, to support, and to catalyze our course of thought. Strategies, similar to Perkin's thinking frames, form an important component in the development of tactical intelligence. Any teaching strategy is a sequential arrangement of instructional activities that is employed over a period of time and is intended to achieve a desired student learning outcome. In the "T-cubed" model, the inservice sessions focused on a number of different teaching strategies as ways to enhance specific thinking skills, e.g. graphic organizers for classification, comparing and contrasting, cooperative learning methods, predictive questioning for comprehension, matrices for problem solving, mapping strategies for analysis, etc. These strategies were presented and modeled by the core-teachers. All teachers were then encouraged to practice the strategies and use them in the classroom. During this phase of the program, teachers encouraged each other, engaged in voluntary peer observations, and discussed the application of the strategies in the various subject areas and at the various levels. Often the result of such interactions led to realization that the teachers themselves were the richest source of strategies which, when focused on producing effective thinking, became another girder in the bridge of staff development.

The third aspect of the framework combines resources and strategies to create a pattern of teaching-learning activities which focus on application. Teachers plan for the teaching of thinking. Teachers evaluate, select, and use instructional materials which incorporate thinking skills. Teachers model thinking behaviors for their students. Students are provided with opportunities for practicing thinking behaviors, and demonstrating the application of thinking skills in new and different situations. Such experiences are the interface between theory and the actual impact on learning. At this point theory becomes effective teaching for thinking, and

thinking becomes the very essence of the course of study.

Two faces of the "T-cubed" model remain (see Figure 4). They are already defined by the three dimensions and three faces of this staff development model. Competence, collegiality, resources, strategies, and applications. All combine to enhance the "thinking-teaching behaviors". Supported by the basic assumptions and interacting continuously in the medium of the course of study, these components of the model generate the sixth face -- the "thinking-learning outcomes" (see Figure 4). The model now has closure. In reality it defines a dynamic educational atmosphere that fosters growth in effective thinking for both teacher and student.

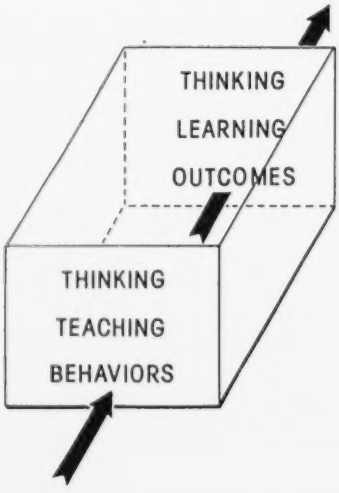

Figure 4. Faces 5 and 6 of the T-cubed model.

Thinking behaviors become teaching behaviors in the same way that teaching behaviors lead to more effective thinking. Teachers themselves become more skillful thinkers as they examine and model ways of teaching their students to think. Personal commitment to professional growth is enlivened. Teachers enthusiastically claim ownership of their own mutual improvement. Most importantly, as teachers internalize the thinking skills they are teaching, they are better able to bring a diversity of strategies to meet the individual learning styles of each of their students.

Conclusion

The influence of such teachers on students in incalculable. Lipman observes that while thinking is natural, it can also be recognized as a skill capable of being perfected (1980). Teachers as well as students must be taught strategies for making meaningful use of knowledge. As teachers consciously focus on tactics for thinking, students begin to take on personal responsibility for their learning; both teachers and students internalize skills which bridge the gap between thinking-teaching behaviors and thinking-learning outcomes.

"The child who has gained proficiency in thinking skills is not merely a child who has grown, but a child whose capacity for growth has increased" (Walsh and Paul, 1986, p. 5). Teachers who engage in meaningful staff development such as described in the "T-cubed" model, not only enhance their teaching, but also grow in their own capacity for thinking.

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